

REMARKS

Claims 1, 4, 6, 8, 9, and 10 have been amended. More specifically, claims 1 and 6 have been amended to specify that the antimicrobial coating is non-volatile. Support for this amendment is found in the as-filed specification, for example on page 4, in the third full paragraph. Claims 8 and 10 have been amended to be consistent with the language used in the as-filed specification, for example on page 2, last paragraph, when describing the pre-sterilization section 6b. Claim 4 has been amended to clarify that the antimicrobial coating is a quaternary amine in a silane. Support for this amendment is found in the as-filed specification, for example on page 4, third full paragraph. New claims 11-20 have been added. Support for these claims can be found in the as-filed specification, as summarized below.

CLAIM	LOCATION
11	page 4, third full paragraph
12	page 4, third full paragraph
13	page 4, third full paragraph
14	page 2, fifth full paragraph; page 4, third full paragraph; and page 5, first full paragraph
15	page 2, sixth full paragraph
16	page 2, last paragraph; and page 4, last paragraph, continued on page 5
17	page 3, first paragraph
18	page 3, first paragraph
19	page 4, third full paragraph
20	page 4, third full paragraph

The Examiner has rejected claims 1-2, 6-7, and 9 as being anticipated under 35 U.S.C. §102(b) by the patent to Pellin, U.S. Patent No. 4,102,654. The Applicant and their attorneys have carefully considered the rejection and believe that the claims as amended are patentably distinct over the '654 patent.

The '654 patent teaches an ionizer that comprises a dry filter 4, a wet filter 5, a fan 6, a positively charged grid 7, a negatively charged grid 8, a negatively charged venturi 9 and a germicidal tube 10 that generates shortwave ultraviolet radiation.¹ Wet filter 5 may be impregnated with a bactericidal or deodorizing liquid.²

In contrast, the Applicant claims an apparatus in which one of the internal surfaces is coated with a non-volatile antimicrobial agent. The '654 patent does not teach, disclose, or suggest a coating of a non-volatile antimicrobial agent. The bactericidal liquid of the '654 patent is not a coating, but rather is a liquid that is impregnated, or permeated, into the wet filter. The bactericide of the '654 patent is used in a liquid form, as emphasized by the designation of the impregnated filter as "wet." As one of ordinary skill in the art would recognize, liquids by nature tend to evaporate, and are therefore not non-volatile. Applicant believes that amended claims 1 and 6, which require a non-volatile antimicrobial coating, as well as all claims dependent thereon are not anticipated by the '654 patent. Applicant therefore respectfully requests that the Examiner withdraw the rejection under 35 U.S.C. §102 of claims 1, 2, 6, 7 and 9.

The Examiner has rejected claims 3, 8, and 10 under 35 U.S.C. § 103(a) as being unpatentable over Pellin, U.S. Patent No. 4,102,654, in view of Smith, WO 92/20974. Claims 3, 8, and 10 are dependent claims, with claim 3 dependent upon claim 1 and claims 8 and 10 dependent upon claim 6. Applicant believes that amended claims 1 and 6 are patentable over the cited references, and therefore that dependent claims 3, 8, and 10 are also patentable.

¹Col. 2, lines 28-57.

²Col. 2, lines 32-33.

The Smith PCT publication teaches a disinfectant system for disinfecting an air stream, comprising baffle means and ultra-violet lamp means.³ The Smith publication does not teach, disclose, or suggest a non-volatile antimicrobial coating. Nor does the '654 patent teach, disclose, or suggest a non-volatile antimicrobial coating, as discussed hereinabove. Therefore, even if the cited references are combined, they do not teach every limitation of the subject claims, because neither of the cited references teach or suggest a non-volatile antimicrobial coating.⁴ Applicant therefore respectfully requests that the Examiner withdraw the rejection under 35 U.S.C. § 103.

The Examiner has rejected claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Pellin, U.S. Patent No. 4,102,654 in view of Tsukahara et al, U.S. Patent No. 4,876,070. The Applicant and their attorneys have carefully considered the rejection and believe that amended claim 4, which depends from amended claim 1, is patentable over the cited references.

Claim 4 recites a method of purifying air comprising withdrawing air from an enclosed space, passing the withdrawn air over surfaces coated with a non-volatile antimicrobial agent, through an ultraviolet radiation, and returning the thus irradiated air to the enclosed space, wherein the surfaces are coated with a quaternary amine in a silane. The Examiner recognizes that the '654 patent does not disclose that the antimicrobial agent is a silane. However, the Examiner cites the '070 patent and suggests that it would have been obvious to modify the method of Pellin to include silane. Confusingly, the Examiner states that it would have been obvious to include silane in the method of Pellin in order to strengthen the binding of the antimicrobial agent and the resin, even though Pellin does not teach, disclose, or suggest a resin.

³Page 4, line 18 to page 5, line 8.

⁴*See In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (stating that all the claim limitations must be taught or suggested by the prior art to establish prima facie obviousness of a claimed invention).

The '070 patent teaches an air blower apparatus having synthetic resin components.⁵ An antimicrobial agent may be added to the resin components prior to molding the components.⁶ The '070 patent teaches that a silane may be used as a coupling agent to bind the antimicrobial agent within the resin component.⁷ The '070 patent does not teach, disclose, or suggest a method in which air passes over surfaces coated with a non-volatile antimicrobial agent. Indeed, the '070 patent teaches away from coated surfaces. Specifically, the '070 patent teaches that if the antimicrobial agent is *coated* on the air filter net, instead of incorporated into the resin component itself, there will be decreased oil absorption and the antimicrobial agent will be washed out.⁸ One of ordinary skill in the art would not have been motivated to combine the cited references to arrive at the present invention, because the '070 patent teaches away from a coating. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.⁹ A prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention.¹⁰

The subject application claims a method of purifying air comprising withdrawing air from an enclosed space, passing the withdrawn air over surfaces coated with a non-volatile antimicrobial agent, through an ultraviolet radiation and returning the thus irradiated air to the enclosed space. Neither the '654 nor the '070 patent teaches, discloses, or suggests surfaces coated with a non-volatile antimicrobial agent, or for that matter a quaternary amine in a silane. In light of the amendments made to claims 1 and 4, Applicant believes that the

⁵Col. 1, lines 32-34.

⁶Col. 2, lines 41-42.

⁷Col. 3, lines 1-33.

⁸Col. 3, lines 44-54.

⁹*In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

¹⁰*W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

amended claims are patentable over the cited references, and respectfully requests that the Examiner withdraw the rejections under 35 U.S.C. § 103.

New claim 11 depends from claim 1 and further recites that the surfaces are coated with 3-(trimethoxysilyl)-propyl dimethyloctadecyl ammonium chloride. New claim 12 depends from claim 6 and recites that surfaces of the apparatus are coated with a quaternary amine group in a silane. New claim 13 also depends from claim 6 and further recites that the surfaces are coated with 3-(trimethoxysilyl)-propyl dimethyloctadecyl ammonium chloride. None of the cited references teach, disclose or suggest an apparatus or method having a surface coated with a quaternary amine in a silane or with 3-(trimethoxysilyl)-propyl dimethyloctadecyl ammonium chloride. Therefore claims 11-13 are believed to be novel and non-obvious over the cited references.

New claim 14 recites an apparatus for purifying air comprising components including a fan system, an air extraction vent, an air flow conditioning section, and an ultraviolet illumination section, said components being connected via ducting, where at least one of said conditioning section or said illumination section is coated with an antimicrobial agent. None of the cited references teach, disclose, or suggest an apparatus having at least one of said conditioning section and said illumination section is coated with an antimicrobial agent. Therefore claim 14 is believed to be novel and non-obvious over the cited references.

New dependent claims 15-20 claim further aspects of the apparatus of claim 14. Specifically, new claim 15 recites that the air flow conditioning section further comprises a filter. New claim 16 further recites that the filter comprises activated charcoal, metal, or synthetic or natural fibers. New claim 17 recites that the air flow conditioning section further comprises a fixed, multi-bladed directional fan. New claim 18 recites that the air flow conditioning section further comprises fixed shaped or planar members positioned at an angle to the air flow. New claim 19 recites that surfaces of the apparatus of claim 14 are coated with a quaternary amine in a silane. New claim 20 recited that surfaces are coated with 3-(trimethoxysilyl)-propyl dimethyloctadecyl ammonium chloride. As stated above, none of the cited references teach, disclose, or suggest an apparatus having at least one of said conditioning section and said illumination section is coated with an antimicrobial agent.

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Nor do any of the cited references teach, disclose, or suggest an apparatus having a surface coated with a quaternary amine in a silane or with 3-(trimethoxysilyl)-propyl dimethyloctadecyl ammonium chloride. Therefore new claims 15-20 are believed to be patentable over the cited references.


CONCLUSION

In view of the foregoing amendments and arguments presented herein, Applicant believes that they have properly set forth the invention and accordingly, respectfully requests the Examiner to reconsider and withdraw the rejections provided in the last Office Action. A formal Notice of Allowance of claims 1-4 and 6-20 is earnestly solicited.

New claims 11-20 have been added, for a total of 19 pending claims, with 3 independent claims. Therefore, no fee is believed to be due at this time. In the event an additional fee is required with the filing of this Amendment, the Commissioner of Patents and Trademarks is hereby authorized to withdraw the required funds from Deposit Account No. 18-0987. If a withdrawal is required from Deposit Account No. 18-0987, the undersigned attorney respectfully requests that the Commissioner of Patents and Trademarks cite Attorney Docket Number THC.P0003 for billing purposes.

Should the Examiner deem a telephone call to be beneficial in resolving any remaining matters or to place the claims in better form for allowance, the same would be greatly appreciated.

Respectfully submitted,


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